Fermilab

FESHCOM
Electrical Safety Subcommittee

May 22, 2012

Meeting Minutes

Attendance (P=Present, A=Absent, G=Guest)

Mike Utes, Chair	P	Tim Martin	P	John Reid	P
Mark Thomas	P	Matt Kufer	A	John Anderson	P
Adam Walters	P	Joe Pathiyil	P	Miguel Nunez	P
Ken Bourkland	A	Rafael Coll	A	Randy Wielgos	P
Jerry Grant	P	Steve Chappa	P	John Scott	P

Meeting Called to Order: 13:01 in WH7X

This was a dedicated interim meeting called to discuss the action items assigned the ESS during the ESS meeting with the Directorate and ES&H where we discussed the ESS recommendations for finishing the Single Line Electrical Drawings (SLEDs), doing arc flash calculations, and panel labeling. The intent is to give Fermilab management as much information as is available in order that they may make a decision on the best direction to head given the resources available. Action Items are printed in bold.

1) **Create a document describing the SLED addition process; clear through the Engineering Policy Committee**

The committee first discussed what systems would be included in the document. It was decided that although it would be good to have the SLEDs cover all panels, the priority at this time is to focus our efforts only from the 13.8kV transformers down to the 120V/208V panels. This is what has been focused on so far and going to circuits below that would require huge effort, and the arc flash hazard from lower voltage circuits is virtually nonexistent. Any panels and disconnects that would not be included would be automatically classified as per NFPA 70E.

The committee realized that there is not enough room on SLEDs to contain the information to do arc flash calculations. Since this information would make the drawing cluttered at best, it was decided that an auxiliary document or report, which would contain all the information necessary for the calculations, will probably be necessary. This document could be done in Excel or Access, but it was pointed out that the ETAP software may also be able to do this, as well as create SLEDs, though probably not as efficiently. *Post meeting note from Mike: Crawford, Murphy, and Tilly, Inc. (CMT) provided Computing Division this information as a Short Circuit*

Analysis in the form of what amounts to a more detailed SLED, as opposed to a spreadsheet-type document.

A good software package is probably necessary to derive accurate arc flash calculations. The cost of ETAP (power system software) depends on features purchased, number of active seats, and number of nodes (ultimately the size of the circuit) the program can handle. Another popular power system software product is called SKM. These options will be investigated.

We will specify that the SLEDs shall include as a minimum the service from the 13.8kV||480V transformer down to the 120V/208V panels, including panelboards, transformers, fuses with ratings, breakers with ratings, number of phases, and load identification. If there is room, other parameters may be included which will help with the arc flash calculations.

A functional numbering scheme needs to be determined. We will check with FESS to determine this.

D/S/C Electrical Coordinators should be considered for the responsible party for document submission.

2) **ESS: determine if it is viable to identify all panels and equipment and develop a comprehensive list. Then identify panels and equipment that represent high risk for safety or operations. This will allow the lab to single out the equipment that might be candidates for an exhaustive inventory during a scheduled outage, an IR survey, or breaker maintenance program. By identifying equipment through a graded approach (which factors risk and cost), the lab can also understand and document what is being excluded.**

The committee felt that it is viable to identify all panels and equipment. In many cases this is already done. AD and PPD have some panel schedules in the GIS system. TD, CD, BSS, FESS all have AutoCad versions of SLEDs in the GIS system.
Identifying panels which might present high risk for safety or operations can be based upon:

- Old panels
- Heavily loaded subpanels
- Panels with common breakers found extensively at the lab

It was noted that for many of these initial tests, we should consider purchasing spare breakers to avoid the risk of re-installing the old breakers which might be compromised. We will likely learn a significant amount about the old breakers by these initial tests. We also concurred that, if the lab decides to do some of this preliminary testing, it should take advantage of the current shutdown to minimize operational impact.

3) **ESS: Look to see if there is a relatively easy method we could use to document the age of circuit breakers, starting at this point in time. Perhaps FESS's GIS? Or just the above list on an accessible Sharepoint page?**

The age of old circuit breakers, of course, would be very difficult to identify. Breakers installed after some point in the near future, however, should be logged. The committee thought it was not clear that the GIS system would work well for this. It was generally agreed that a common database program might work fine. Logged items should include location, breaker type, breaker settings, date of installation, and date of last maintenance.

4) **ESS: Discuss automating the bookkeeping of the SLED addition and breaker maintenance processes, similar to the system that keeps track of FESHM chapters. This would involve significant work, but would likely be quite effective. If determined a good thing to pursue in the long run, let Nancy know and she will put it in the CD system.**

It was mentioned that FESS already has a Preventive Maintenance system (CMMS System). A system like this might be considered, since the system employs stickers with bar codes that could be used to keep track of equipment installation and maintenance, history of panel labeling, etc. This system behaves differently than the one that keeps track of FESHM Chapters. The latter is a good system for triggering events such as when to review a SLED (if necessary) or when a breaker is due for testing. FileMaker Pro is another database program that might be considered. The ESS will discuss this further when more is known.

5) **FESS: FESS needs to have a plan with an end date for providing the D/S/Cs the range of available fault current and fault clearing times.**

Getting this information is likely to have a high impact. To address this, Joe noted that the clearing times of the Allis Chalmers and G.E. breakers just downstream of the 13.8kV||480V transformers still need to be determined. The bolted fault currents at the transformers' secondary windings are already known. Gathering of this information lab-wide could take two to three years because of the 24/7 nature of running the lab. The impact of shutting things down would also be formidable. Power could be off for the good part of a day to characterize a single location. This would most likely require the services of a contractor, with a lab employee present. John Reid also pointed out that there is a lot of equipment that behaves poorly after being power-cycled.

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The meeting adjourned at 14:17

Minutes Drafted by M. Utes

Next Meeting
The next planned meeting of the Electrical Safety Subcommittee is tentatively scheduled for 1:00 P.M. Monday, **6/4/2012** in WH2NE. The meeting is open to guest attendees.

Electronic Distribution:

Bruce Chrisman
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ESS Members
Division/Section Electrical Coordinators
Guest Attendees